

First records of raccoon dog, *Nyctereutes procyonoides* (Gray, 1834), in Switzerland

Jean-Marc WEBER¹, Dominique FRESARD², Simon CAPT³ & Christophe NOEL⁴

¹ KORA, Thunstrasse 31, CH-3074 Muri, Switzerland. E-mail: jmweber@bluewin.ch

² Cité 101, CH-2325 Les Planchettes, Switzerland. E-mail: pchit@bluewin.ch

³ CSCF, rue des Terreaux 14, CH-2000 Neuchâtel, Switzerland.

E-mail: simon.capt@cscf.unine.ch

⁴ OEPN, Les Champs-Fallat, CH-2882 St-Ursanne, Switzerland.

E-mail: christophe.noel@jura.ch

First records of raccoon dog, *Nyctereutes procyonoides* (Gray, 1834), in Switzerland. - The raccoon dog was introduced to the European part of the former USSR in the last century. Since then, the species rapidly expanded its range throughout Europe and now occurs in Germany and eastern France. Herein, we report the first confirmed observations of the raccoon dog in Switzerland and discuss the potential risks associated to its presence.

Keywords: Raccoon dog - *Nyctereutes procyonoides* - first records - Switzerland.

INTRODUCTION

Originally found across eastern Siberia, northern China, Korea, and Japan, the raccoon dog (*Nyctereutes procyonoides*) was introduced to Europe in the last century. Around 9'000 individuals were released between the late 1920s and mid 1950s in the European part of the former USSR in order to create new fur-producing populations. Since then, the species rapidly expanded its range westwards and colonized countries such as Finland (1935), Sweden (1945), Romania (1951), Poland (1955), Czechoslovakia (1959), Hungary and Germany (1962; Nowak, 1984). Further west, in France, the first documented observation of a raccoon dog was recorded in 1979 (Artois & Duchêne, 1982).

During the last decade, raccoon dog numbers increased dramatically throughout its European range. In Germany for instance, hunting statistics report a 10-fold increase in the number of raccoon dogs killed between 1995 and 1998 (from 398 to 3'250 individuals) in the whole country. Moreover, 4'325 individuals were killed in the state of Brandenburg alone in 2001/02. For comparison, only 94 raccoon dogs were killed in that state in 1995 (Anonymous, 2002). In France, where most observations are restricted to the eastern part of the country, this increase seems less pronounced, though there are strong evidences of reproduction in the wild (Léger, 2001; pers. comm.).

Considering this impressive evolution and its proximity – occurrence of raccoon dog was confirmed in the Rhine valley in Baden-Württemberg (Linderoth, 1997) –, the species could have reached Switzerland already a few years ago. However, if some observations of raccoon dog were occasionally announced in the country, none of them was confirmed (Schmid, 1995). Here, we report on the first documented evidences of raccoon dogs in Switzerland.

MATERIAL AND METHODS

Observation quality for uncommon and/or secretive species like most carnivores varies greatly in precision and reliability. Three degrees of quality (Q1-Q3) are usually considered to standardize data interpretation in the monitoring of carnivore distribution (Molinari-Jobin *et al.*, 2001), Q1 data (e.g. “hard facts” such as individual shot or found dead, and observations documented with photographs) being the most reliable. In this paper, only Q1 observations were taken into account.

Nocturnal, direct observations of raccoon dogs were made using a second generation light intensifier (Carl Zeiss 5.6 x 62 T) and a 30W infra-red illuminator. Pictures were taken with a digital camera (Nikon Photosmart 850) coupled to the nightvision system.

When possible, raccoon dog carcasses were weighed and the following morphometrical measures taken: 1) head and body length (HB), tail length (T), hind foot length (HF), ear length (E) and shoulder height (S). A necropsy was performed at the Institute of Animal Pathology (University of Bern) and stomach content examined for dietary purposes.

RESULTS

The first confirmed observation of a raccoon dog (NP1) in Switzerland was made in Leuggern (47° 33' N, 8° 11' E; altitude: 400 m a.s.l.; Fig. 1[1]) on September 15th 1997. The animal was run over by a car. Details on this individual are missing since no official report was established. According to the game keeper who found it, the origin of the animal could not be determined. The raccoon dog was stuffed and nowadays is exposed in Leibstadt schoolhouse.

Looking for signs of lynx presence along the river Doubs, one of us (DF) observed during about five minutes on December 4th 2002 (21h50) what he considered to be a raccoon dog. The animal was foraging along the shore. Five weeks later, on January 15th 2003 (23h35) and in the same circumstances, a raccoon dog was observed some 500 m downstream from the first spot. However, both observations could not be documented. Finally on April 24th 2003 (03h55), after 144 hours of night observation in the area, a raccoon dog (NP2) was seen again 300 m upstream from the first spot (Commune of Les Bois; coordinates: 47° 11' N, 6° 52' E; altitude: 540 m a.s.l.; Fig. 1[2]). Three pictures of the animal were taken.

On August 6th 2003, a raccoon dog (NP3) was found dead on the verge of the A16 highway between Alle and Porrentruy (Commune of Alle; coordinates: 47° 25' N, 6° 52' E; altitude: 460 m a.s.l.; Fig. 1[3]). The individual, killed by a vehicle, was an adult male in good condition (Table 1). Plums (*Prunus insititia*) formed the bulk – ca.

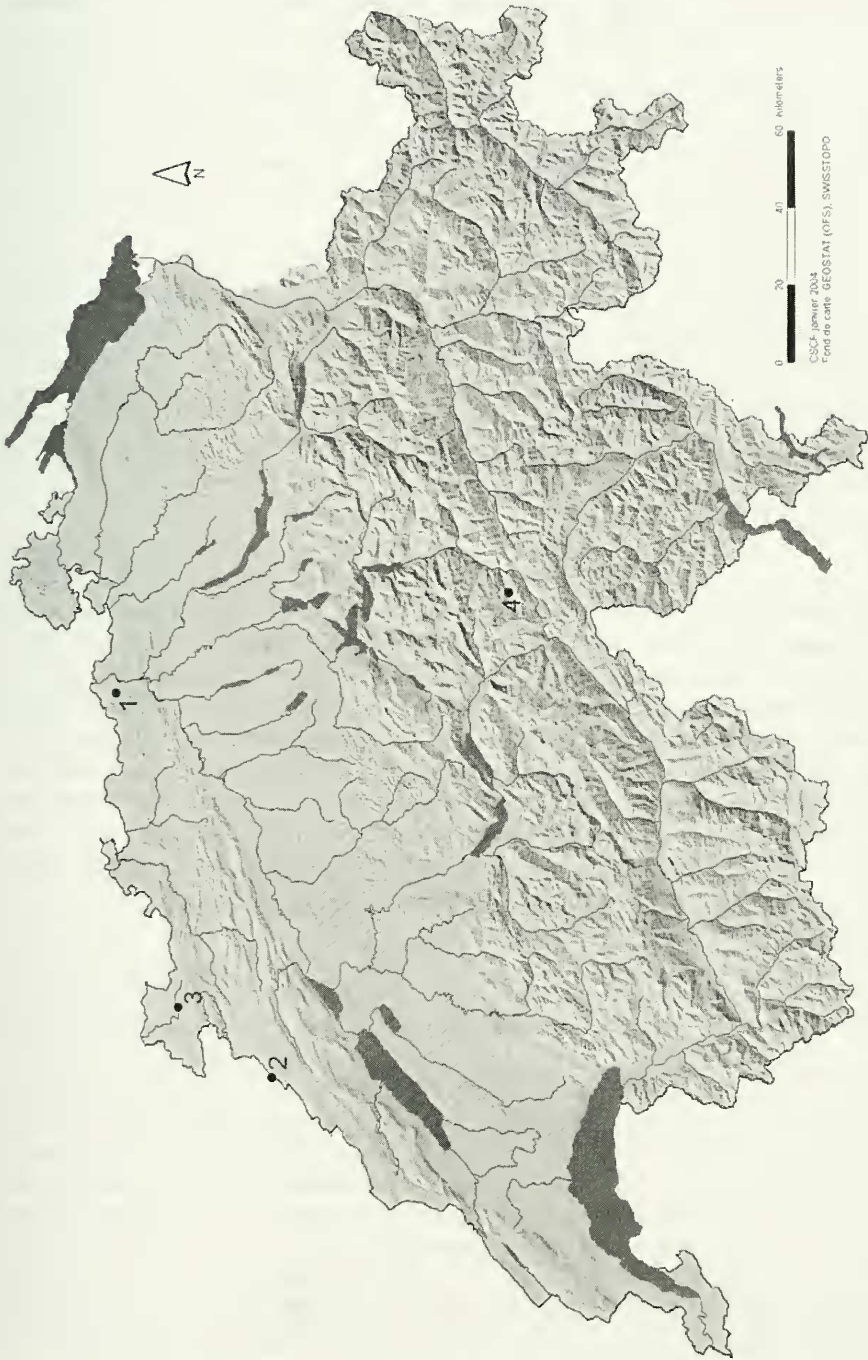


FIG. 1. Location of confirmed raccoon dog observations in Switzerland. 1 = Leuggern, 2 = Les Bois, 3 = Alle, 4 = Göschenen.

95% of the volume – of the stomach content (80 g). The remaining 5 % were made of maize (*Zea mays*), two adults Coleoptera (*Abax* sp.), one larva of an unidentified Diptera, and a few rodent hair and earthworm chetae.

TABLE 1. Morphometric measures of the two raccoon dogs killed in 2003 (see text for abbreviations).

Individual	Weight (kg)	HB (mm)	T (mm)	S (mm)	HF (mm)	E (mm)
NP3	5.8	640	184	285	113	62
NP4	7.6	590	180		115	40

An additional observation of a raccoon dog (NP4) was recorded on October 1st 2003 in central Switzerland. An adult male was shot in the Commune of Göschenen (coordinates: 46° 39' N, 8° 30' E; altitude: 1570 m a.s.l.; Fig. 1[4]). Body condition was good (Table 1), though pronounced tooth wear and the presence of a tumour on the testes suggested the individual to be quite old (M.-P. Ryser, pers. comm.). Stomach content (22.4 g) was predominantly composed of plant material and a few rodent hair.

DISCUSSION

The occurrence of raccoon dogs in Switzerland constitutes a further step in the colonization process of Europe by this exotic canid. Considering its rapid expansion through the continent and its status in the neighbouring German and French border regions (A. Elliger, pers. comm.; Léger, 2001), the presence of raccoon dogs in northern Switzerland is not surprising. The area and its extensive lowland deciduous forests certainly provide suitable habitats and enough food resources for this predator (Duchêne & Artois, 1988). On the other hand, more surprising is the observation reported from the mountains of central Switzerland, since raccoon dogs are seldom found above 600 m a.s.l. (Duchêne & Artois, 1988). Could this individual have escaped from captivity or does this observation reflect the high adaptability of the species? It is difficult to answer without reservation, but to our knowledge no raccoon dog is or was recently kept in captivity in this region.

The striking increase in raccoon dog numbers observed during the last decade notably in eastern Germany (Anonymous, 2002), emphasizes the outstanding capacity of expansion of the species. Several factors may explain this success. Like its close relative the red fox (*Vulpes vulpes*), the raccoon dog has a body size that is small enough to remain relatively inconspicuous, but large enough not to be too vulnerable. Moreover, it is a generalist opportunist predator that may well adapt to changing trophic conditions, and should food resources become scarce during harsh winters, the raccoon dog has the capacity to hibernate (Duchêne & Artois, 1988). Rapid colonization could also be explained by a high rate of reproduction (Helle & Kauhala, 1995). The number of cubs per litter is generally comprised between 3 and 8, but can reach a maximum of 19 (Duchêne & Artois, 1988). Lastly, apart from man, the most important natural predator of the raccoon dog, the wolf (*Canis lupus*), is still uncommon in Western Europe (Duchêne & Artois, 1988). Under these circumstances, it is likely that the colonization of new areas in Europe will continue.

Introduced exotic predators have usually a negative impact on the native fauna (Dickman, 1996; Ferreras & Macdonald, 1999 *inter al.*). Dietary analyses carried out in Romania (Barbu, 1972) and more recently in Finland (Kauhala & Auniola, 2001) showed that raccoon dogs fed extensively on waterfowl and their eggs, and on amphibians amongst others. Therefore, the spread of this predator in Switzerland could possibly threaten, by direct predation, some vulnerable and/or endangered ground-nesting bird species and also contribute to the on-going decline of amphibian populations. Interspecific competition is another potential problem linked to the introduction of raccoon dogs. In Belarus, Sidorovich *et al.* (2000) found a considerable dietary overlap among generalist carnivores, such as red fox, badger (*Meles meles*), pine marten (*Martes martes*), polecat (*Mustela putorius*) and raccoon dog. In addition, their study suggested that after the raccoon dog had reached a high population density, the native generalist predators began to decline. As far as we know, this is the only evidence of a possible intra-guild competition involving the raccoon dog and other carnivores. Therefore, further investigation is clearly required to confirm it unequivocally. Finally, the raccoon dog has an important potential role in disease transmission to native wildlife. In Russia and Poland for instance, it is the main vector of rabies beside the red fox. It also hosts a variety of parasitic helminths, such as trichina (*Trichinella spiralis*), and arthropods (i.e. *Sarcoptes scabiei*) (Duchêne & Artois, 1988).

As an exotic species, the raccoon dog can be shot year-round by game-keepers in Switzerland. However, regulation by hunting seems ineffective as suggested by the German example (Anonymous, 2002). Consequently, there is no obvious reason why colonization of suitable areas in Switzerland should stop. Actually, raccoon dogs could be more common in Switzerland than expected, recent observations being only the tip of the iceberg. For this reason, and considering the lack of scientific knowledge on the species in Western Europe and the above-mentioned potential problems, a monitoring program of the raccoon dog population should be implemented as soon as possible.

ACKNOWLEDGEMENTS

We would like to thank R. Altermatt, M. Artois, M.-J. Duchêne, A. Elliger, A. Kalt, F. Léger, H. Mattli, M.-P. Ryser and F. Schluchter for their precious collaboration. S. Schorderet Weber made useful comments on the first draft of the manuscript.

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